Improve Resource Migration Using Virtual Machine in Cloud Computing: A Review

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Abstract:

Cloud computing technology can be widely used depends on the virtualized resource scheduling can timely and reliably assurance user service quality. So efficient and flexible resource scheduling in cloud computing is of great significance. In view of the cloud computing environment, the resource scheduling model based on virtual machine migration. Migration contributes to efficient resource management in cloud computing environment. The core of Cloud computing includes virtualization of hardware resources such as storage, network and memory provided through virtual machines (VM). When the user needs additional resources for virtual machine (VM) than the available resources of datacenter, the whole process will hang and also affects to the other running process in virtual machines of data center**.**

Keyword*: Cloud Computing, Virtual machine, virtualization Migration (VM), Resource Allocation.*

I INTRODUCTION

Cloud computing uses network to make a lot of computer resources unified management and scheduling, forming pools of computing resources, each end user can get powerful computing capability and a variety of information services according to the needs of the business through the Internet Cloud computing is based on open standards and services, on the centre of Internet and provides safe, fast and convenient data storage and network computing service. In Cloud Computing Environment mainly user-based resource allocation. Resource allocation module and monitoring module mainly adopt dynamic resource allocation strategy; implement the adaptive dynamic allocation of resources in order to realize the efficient use of data center resources. The main idea of the resource allocation strategy is to protect user request resources based on SLA, and timely recover completed tasks resources, reduce unnecessary consumption of resources to ensure the smooth operation of the system. [1].

Migration techniques can be classified into non-live migration and live migration.

Non-live migration refers to the process of migrated running VM that is firstly paused and afterward resumes when all the required migration workloads have been completed. Services provided by the VNs

are not accessible during the migration, and open network connections may cause timeout or Disconnection. More advanced live migration mechanisms do not require pause of the VMs.

Live migration mechanisms: migrate as fast and efficient as possible in order to provide dynamic load balance, zero downtime. Live migration provides many benefits such as energy saving, load balancing, and easy maintenance. [2]

Cloud technology is combination of several other technologies such as Virtualization, Service Oriented Architecture (SOA) and web Security limitations in these traditional technologies are also inherited in the overall security of Cloud along with their benefits.

As Cloud infrastructure consists of large scale, distributed, heterogeneous and completely virtualized resources, therefore the traditional security mechanisms are not enough for this environment. Live migration of VM introduces severe security risks in traditional data centers as well as in Cloud environment. The contemporary research on live migration so far is performance oriented and security issues have not received much attention. There are several security risks in live VM migration process provided by Xen, KVM and VMware hypervisors. Live VM migration without security features becomes single point of failure (SPF) for Cloud environment. [3]

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For better resource utilization, many cloud providers start with static allocation of VMs to physical machines (PMs) using a resource scheduler as shown in Figure 1. However, the resource utilization in the cloud environment decreases as the number of VMs increases in the PMs. This is due to mainly the following two reasons. (1) There are always some unallocated resources left on the PMs. This is due to the unpredictable incoming VM configurations from cloud users. Without accurate historical data, it is difficult to allocate VM properly. (2) Memory balloon and CPU virtualization are widely supported features of virtualization technology. It enables cloud users to configure their VMs memory size and CPU number at operating time, which makes the scheduler work less efficient. These two reasons make the static scheduling approach unfit, and instead, requiring dynamic re-allocation. Therefore, a dynamic VM re-allocation on the PMs is required for improving resource utilization in the cloud environment. [6]

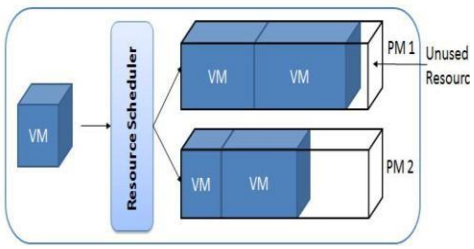

Figure 1. Static VM allocation [6]

II Dynamic Resource Allocation algorithm

Load balancing is achieved by dynamic migration of the overloaded virtual machines. By migrate the virtual machines to available data center dynamically, overloading of datacenter can be avoided. This can be achieved through VM Dynamic resource allocation algorithm and DC balancing algorithm. Thus, overloaded virtual machine under the datacenter is Migrated to available datacenter using their proposed Algorithm. Through this, performance of the datacenter is maximized and results in high user's satisfaction at data centers. [1]

In this Dynamic Resource Allocation Algorithm, the virtual machine under host, will schedule dynamically as per the user's request. Resources will be provided to the user as per the requirement of user. If the user wants to extend the memory, user can request for the additional resource as they need. Dynamically the resource will be given to the requested virtual machine and updated dynamically. In future, we will develop a Dynamic resource allocation algorithm for underutilized VM in datacenter. This algorithm should have criteria for selecting a VM, selecting a node which has sufficient space for underutilized virtual machines. This ensures more Load Balancing in private cloud. [4]

III Auction-Based VM Allocation

They express their needs by submitting bids on the price they would like to spend on the commodities. The proposed auction based VM allocation mechanism works by modeling agents as bidders and VMs as commodities, which is described formally in Algorithm step by step. [5]

1. In this Algorithm, initially, all newly submitted VMs _ are unallocated at each bidding round.

2. Each agent *ai* only bids for the largest unallocated VM that it is capable of hosting.
3. After bidding for the target VM $\theta * ai$, each agent *ai* broadcasts its bid *Bi* to all of the other agents for winner determination.

4. A bid $Bi = <pi, \lambda i/ci>$ consists of the PM identity
pi and its cost-capacity ratio $\lambda i/ci$.

5. After all bids are broadcasted, all of the agents send a winner acknowledgment message <Ack> to the winner agent that has the minimum cost-capacity ratio.

6. In the event of a tie, the agent that has the smallest index is selected as the winner.

7. The agent ai that receives ack from all of the other agents wins the current round bidding. The winner agent ai then is responsible for running its targe

θ * ai and informing all of the other agents that θ * ai has been allocated.

8. This bidding process (steps 2–7) proceeds round by round until all VMs are allocated.

An auction based VM allocation mechanism, which is devised for agents to decide which VM should be allocated to which PM for better resource utilization.

IV Negotiation-Based VM Consolidation

To tackle system dynamics and avoid incurring prohibitive VM migration overhead, a local negotiation based VM consolidation mechanism is devised for agents to exchange their assigned VMs for energy cost savings. The dynamic experimental results demonstrate that the multi agent approach can adapt to system dynamics well by consuming as little energy as the benchmark centralized and distributed global-based resource consolidation approaches, but largely reducing the migration cost, showing its great potential for practical applications. [5]

A negotiation based VM consolidation mechanism, which is designed for agents to exchange their assigned VMs to save energy cost and address system dynamics. A possible reason is that there are only a small number of profitable VM migrations executed in PRO. These advantages make MA approach a preferable choice for cloud computing resource management to reduce energy cost in real time, while consuming tolerable amounts of network traffic.

V Cloud Reconfiguration Algorithms

Researching on cloud reconfiguration algorithms is an active research area of Cloud computing. One problem addressed is trying to minimize number of PMs in the cloud Environment. This is commonly referred as VM Consolidation. The static re- allocation approach is a simple heuristic for the MDBP problem and applies it to minimize the number of PMs required to host a given web traffic. A resource management algorithm to attempts to minimize the number of migrations of VMs while minimizing the number of PMs used. A similar objective is also pursued in and these approaches, however, have focused on how to calculate a new configuration, and have neglected the migration overhead. An algorithm is

proposed to pack VMs according to their CPU needs while minimum the number of migrations will be used. Researchers have also applied a variety of methods to achieve greater resource utilization.

Prediction techniques and queuing theory results are employed to allocate resources efficiently within a single PM serving a web workload. It proposes an optimization algorithm for resource economy that allocates PM resources depending on the expected financial gain for the hosting centre. [6]

By using a probabilistic multivariate model, the algorithm selects suitable PMs for VM re-allocation before a reconfiguration Plan is generated. their evaluation indicates that there is only a minor decrease in resource utilization levels that results from reducing number of PMs for re-allocation. So, the approach leads to a lower number of VMs being reallocated as number of PMs Considered for VM re- allocation decreases.

Cloud reconfiguration algorithms are based on VM reallocation techniques that construct a suitable reconfiguration plan for achieving greater resource utilization in the cloud environment. Existing cloud reconfiguration algorithms [8, 9, 10] aim to solve the problem of low PM resource utilization to allow more VMs to be allocated in the cloud environment

VI Energy Efficient Network-Aware VMs Migration

The destruction of VMs from the PMs gives an opportunity to the service provider to migrate the VMs from the underutilized PMs to the energy efficient PMs, and thus switching-off underutilized/idle PMs and switches at the cloud data center. the objective function for muli-objective VMs migration problem is defined in such a way that VMs are migrated from one PM (source node) to another PM (destination node) such that the maximum number of VMs are migrated to the destination node within their capacity. [7]

Table: - Literature Review

Year/ Publication	Author	Technique/Algorithm	Tools /Technology	Research Gap
2012 (IEEE)	Sijin He, Li Guo, Moustafa Ghanem, Yike Guo	Improve resource utilization	Cloudsim	Author Proposed developing relationship between predefine range and select suitable physical machine to improve migration cost
2014(IEEE)	Divyabairavi Soundararajan, ,Sankari Subbiah	Dynamic resource allocation	Cloudsim	Author Proposed develop dynamic resource allocation in VM datacenter.
2016(IEEE)	Wanyuan Wang, Yichuan Jiang	Multiagent-Based Resource Allocation	Cloudsim	Author Proposed for resource allocation each and every user take full advantage of VM resource as per user request but cloud service provider cost will be increase.
2017(IEEE)	Tian Fu , Zhen Wang	Resource Scheduling Mechanism Based On Virtual Machine Migration	Not mention	Author Proposed resource scheduling model based on virtual machine migration can better achieve the scientific distribution of data center resources and reduce data center load; provide a practical and effective approach to the reasonable

				allocation of resources and guarantee of user service
2018(IEEE)	Neeraj Kumar Sharma, Priyanka Sharma	Energy Efficient Quality of Service Aware Virtual Machine Migration	Cloudsim	Author Proposed that they have not consider network aware VM allocation in cloud data center.

VII Conclusion

In this paper, we surveyed, resource migration using virtual machine in the cloud computing it is very important for cloud providers to manage and assign all the resources in time to cloud consumers as their requirements are changing dynamically. From the comparing above algorithms we conclude that, Cloud Reconfiguration Algorithms is better than the other algorithm reason is In the user-defined view, the imbalance heuristic performs slightly better than the volume heuristic. In the provider-defined view, the volume heuristic performs significantly better than the imbalance heuristic in which it improves resource allocation, utilization, and energy efficiency in the Cloud

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